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Enhancing students' learning process through interactive digital media: New opportunities for collaborative learning

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ABSTRACT

In this paper, we describe and review several examples of web technology-enabled teaching and learning approaches at undergraduate level in an Asian institution of higher learning. We begin by reporting on experiences made in the context of an iPad-enabled mobile learning project conducted during a Knowledge Management course (excursion) in support of the university's technology-enabled learning vision. This is followed by reflections on the deployment of a collaborative social learning platform website (Edmodo), wiki- and web page-creation tools (Google Site), animated videos, etc. in elective courses on leadership and human capital management. Finally, we describe a proven project-based learning approach adopted annually by numerous undergraduate teams of four to six students as part of their compulsory capstone course in the field of information systems. Besides documenting the multiple opportunities which interactive digital technologies offer for both instructors and students in order to learn collaboratively, we discuss some of the challenges when it comes to implementing and institutionalising technology-enabled teaching and learning in higher education.

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1. Introduction

Rapid change in terms of students' expectations for 'effective' learning and teaching as well as the continuous influx of new technologies such as social media (García-Peñalvo et al., 2012; Arnold & Paulus, 2010; Damiani, Lytras, & Cudré-Mauroux, 2010; Ebner, Lienhardt, Rohs, & Meyer, 2010) represent significant drivers for greater innovativeness in higher education. We argue that instructors must push themselves to learn more about technology-enabled learning processes in order to innovate teaching and learning. For us, teaching itself provides a great opportunity for lifelong learning, and we feel fortunate to be part of a community of learners at our university that is open to innovation and peer learning via regular knowledge sharing sessions. With many years of experience in practice, all of us are trying to provide a balance between practice, research, and application in our teaching. Our goals are to provide each individual student with an enjoyable learning experience via useful feedback, engagement, self-discovery through online tools, individual reflection, along with class participation and

team dynamics. Our approach involves both collaborative student learning and continuous innovativeness with the help of web technologies in order to enhance the value added of the learning process.

1.1. Research problem

The research problem under investigation is exploratory and fluid in nature and can be formulated as follows: 'Mastering interactive digital media for effective structured collaboration so that students in groups work together to maximize their own and each other's learning'. To ensure that students cooperate in the (digital) class context requires special competencies (Johnson & Johnson, 1999; Picciano, 2002; Johnson, 2003). According to educational psychologists, instructors need to create *positive interdependence* on the basis of challenging group tasks and goals, *individual and group accountability* with respective controls (e.g. in form of peer assessments) and *promotive interaction*, both face-to-face and online (Picciano, 2002) so that group members have the opportunity for real knowledge sharing, social support, self-critical reflection, and praise each other's efforts to learn (<http://www.cehd.umn.edu/edpsych/people/Faculty/Johnson.html>). In addition, students need to be equipped with the *required interpersonal and small group skills* to enable them to achieve both project and team tasks such as the ability to *understand the communication styles of*

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'foreign' students they are working with. This is even more critical in digital contexts because communication signals can easily be misinterpreted due to the lack of face-to-face contact. Despite the digital mastery often demonstrated by young learners, the popularity of digital media such as WhatsApp or Short Message Service (SMS) has arguably limited their ability to communicate effectively in diverse face-to-face situations which need to be managed. Another important enabler of collaborative learning is *group processing* which can be considered effective when group members are able to monitor the attainment of group goals and manage to work smoothly as a real team. Table 1 below summarizes how the authors integrated these five components of collaborative learning into the teaching and learning approaches featured in this article.

In this article, we present several examples of our teaching and learning approaches. In the first part, we report on experiences made in the context of an iPad-enabled mobile learning project conducted during a Knowledge Management course (excursion) in support of the university's technology-enabled learning vision (Benson, Morgan, & Tennakoon, 2012; Wallin & Von Krogh, 2010). Apple's second generation iPad 2 is a tablet computer with various learning enhancing features. Students can download books, journal articles, music, movies, web content as well as games. It also features a front-facing and rear-facing camera to capture audio–visual materials. Learners can access social media sites such as Facebook, Twitter or Youtube and communicate instantaneously with the instructor and peers while on a site visit, at home, in the classroom or on the go. Through applications such as GoodReader, iPad owners can import, store, read and manage large files such as images or documents. Qualitative feedback from undergraduate students who took part in the iPad pilot project aimed at enabling them to appreciate structure and function of a water-related knowledge hub in Singapore provides initial evidence that instructors can effectively engage learners to appreciate pedagogical objectives and to internalize learning outcomes by leveraging on the iPad's Gen Y friendly apps (Lytras & Ordóñez de Pablos, 2011). In the second part, we reflect about the novel use of web technology in two newly developed elective courses on leadership and human capital management (Thomas, Smith, & Diez, 2013) with special reference to the use of collaborative social learning platform websites (Edmodo), wiki- and web page-creation tools (Google Site), animated videos, mobile apps, etc. to help enhance the learning process. While not everything was 100% effective, the overall results were encouraging as evidenced by excellent course and instructor ratings. The third part presents experiences made with project-based learning. Every year, around fifty-five undergraduate teams of four to six students are required to complete a capstone course for the School of Information Systems. Each team spends approximately five months working with an industry sponsor using the latest tools and techniques. Students actively learn by implementing the system to solve a real world problem. In addition to delivering value to the local sponsor, our students learn specialized skills currently needed in the marketplace, which might not yet be incorporated into electives and core courses. We discuss the tradeoffs of providing students and project sponsors flexibility in designing projects while at the same time ensuring that all students are delivering consistent, assessable milestones. The approaches described here can also be used for postgraduate course teaching as personal attention on the basis of individual learning approaches and technology-enhanced learning are even more critical.

1.2. Method and research questions

Research methods deployed in this explorative–interpretative case study (Eisenhardt, 1989; Stebbins, 2001) include reflections about our own class experiences based on memos and sporadic

observations of learners, the analysis of secondary literature as well as discussions with students, instructors and learning experts in the university's Centre for Teaching Excellence (CTE). The largely descriptive–reflective accounts of our experiences of embedding web technologies in collaborative (blended) learning contexts do require a more systematic analysis vis-à-vis similar studies in order to develop testable hypotheses about effective collaborative teaching and learning for a future quantitative research study (Cook, Bradley, Holley, Smith, & Haynes, 2006; Lundin, Lymer, Holmquist, Brown, & Rost, 2010). The main research questions we intend to address in this paper are as follows:

- How can new educational technologies and approaches such as the iPad, social learning platforms such as Edmodo, team-oriented sites (e.g. Google Sites, a wiki- and web page-creation tool provided by Google's Apps Productivity suite) or 'appification' (collaborative apps development and application projects led by students on behalf of external clients) enrich the collaborative learning experience of students in institutions of higher learning?
- How can such interactive web technologies and approaches be effectively integrated into course designs and delivery modes?
- Besides the opportunities which these technologies offer for both instructors and students, what are some of the challenges when it comes to implementing and institutionalising respective initiatives?

2. Encouraging university students to learn with iPads: New opportunities for mobile learning

One of the latest technologies which can support (mobile) learning in the context of blended learning is the iPad. In 2011, the authors began experimenting with iPads in an undergraduate course on Knowledge Management after the university had approved funding and sourced a couple of iPads. Apple's second generation iPad 2 is a tablet computer with various learning enhancing features. Students can download books, journal articles, music, movies, web content as well as games. It also features a front-facing and rear-facing camera to capture audio–visual materials. Learners can access social media sites such as Facebook, Twitter or YouTube and communicate instantaneously with the instructor and peers while on a site visit, at home, in the classroom or on the go. Through applications such as GoodReader, iPad owners can import, store, read and manage large files such as images or documents. In the context of higher education, the iPad arguably represents an effective tool for instructors to engage students and to encourage them to expand their knowledge and skills aimed at making learning more meaningful, fun and effective (Wankel, 2009).

It is challenging for educators to effectively engage students and to ensure meaningful participation in the classroom. More and more universities proactively support teaching innovations and encourage instructors to deploy educational technologies in class in order to motivate learners and to enhance learning impact (Saeed, Yun, & Sinnappan, 2009). While laptops are a common sight in the classrooms of the Singapore Management University (SMU) which serves as the backdrop for this paper, the use of the iPad among students is still rare. In the following we report experiences made during the introduction of iPads in a Knowledge Management class in an undergraduate course with 45 students aimed at enabling them to appreciate both the economic importance and management challenges of Singapore's new economic cluster 'WaterHub'. Knowledge Management, the core topic of the course, is a key enabler of building sustainable knowledge clusters such as Singapore's WaterHub due to the importance of knowledge for innovation and value creation.

Table 1

Components of collaborative learning exemplified in the teaching and learning approaches featured in this article.

Core collaborative learning elements	Learning with iPads	Leveraging web technology for various connection points	Tackling real business problems with capstone courses
Positive interdependence	Challenging group tasks and stretch goals included the mapping of Singapore's water cluster	Mobile application connection with push notifications created multiple connections. At the same time the web-based lessons provided content on demand to create multiple learning opportunities	The capstone projects are client-centric and therefore very demanding. Teams can see the progress of other teams and the technologies they use on a project wiki which encourages cooperative learning
Individual and group accountability	Group was intrinsically motivated, perhaps as a result of the innovative learning mode: on the 'go' in a bus/mobile site visit	The technology allows transparency with regard to the frequency of individual and team contributions which creates a bit of competition	Understanding projects of other teams creates a sort of 'healthy competition' which motivates each team to strive to achieve more
Promotive interaction	Cluster and quiz assignments required good collaboration both on the go during/after the site visit	On line brainstorming along with team shared documents facilitated new ways of collaboration	Knowing which technology is used in other projects stimulates the willingness to help each other when facing difficulties, e.g. with the tools. Incentives are provided for students to help each other
Appropriate use of required interpersonal and small group skills	No special skills training was provided except for a short briefing before the site visit	Students were already well prepared for working in teams through prior courses. The web technology enhanced and challenged them with the on-line posting of ideas	Students have a software engineering prerequisite during which they develop a team-based class project. Through this, students hone small group skills
Group processing	The nature of the 'graded' group activity (cluster map) enabled smooth work processes and goal attainment	Weekly instructor feedback to each team on the team web site creates a feedback and coaching loop that forces more group assessment and self evaluation	There are several milestones and gradable moments in the capstone project journey during which reviewers assess the team with a team grade. This motivates them to work together and helps to avoid social loafing

Groups of 6–8 students were given one iPad and tasked to execute various learning assignments such as activating the iPad's map application to get a spatial understanding of Singapore's water catchment areas or the business locations of key corporate and institutional players such as Hyflux or the Public Utilities Board (PUB). They were also invited to experiment with the iPad's multiple platforms such as internet search function, communication and social media applications such as email, YouTube or image capturing to gain a deeper understanding of Singapore's WaterHub with its over 70 local and international organisations ranging from R&D, engineering and manufacturing to headquarter activities. Fig. 1 below shows the cluster map which the students created as part of the assignment. The establishment of a diversified water supply (coined the Four National Taps), implementation of holistic water management practices, and the promotion of a water conservation culture are significant achievements that Singapore has made in recent years as it progresses towards self-sufficiency in terms of water supply by 2061.

Singapore's water research and activity hubs are primarily located in the southern shore regions. While some test beds, research centres and collaborating educational institutions are geographically close to each other, the entire cluster is still evolving due to its relatively young age and the recency of water-related policy issues and forceful interventions which were instrumental for its rapid evolution. Since 2006, this new cluster has created over 2300 new professional and skilled jobs, and Singapore-based firms have secured related overseas contracts worth S\$ 8.4bn. In terms of the cluster life cycle, the WaterHub is located in-between the 'emerging stage' where actors start to cooperate qua agglomeration effect around a core activity and the 'collaborative' or 'established' stages where the cluster has gained a distinct identity and where it has attracted new entrants due to real collaboration advantages.

The student groups were tasked to provide answers to various questions with the help of the iPads in the context of a site visit of the NEWater Visitor Centre in Bedok such as: (i) names and business models of well-known companies that have chosen WaterHub as their launch pad to expand and set up their R&D centres in Asia; (ii) role and mission of PUB's Institute for Advanced Learning for

Water Professionals; (iii) purpose and market prospects of polymeric hollow fibre ultra filtration membranes; (iv) key processes involved in the production of NEWater or (v) why proximity and technological closeness do matter in successful knowledge hubs. Students were encouraged to take pictures of relevant images during the site visit such as membranes. All assignments had to be tackled both on the way (in the bus) to the NEWater Visitors Centre, and at the centre itself in order to test the mobile learning enhancing power of iPads.

Towards the end of the term, the class was invited to reflect about the usefulness of iPads by answering three evaluative questions such as: What did you like or dislike about using the iPads in OBHR211? In what ways can the iPad facilitate and enhance learning? Where do you see potential problems? Overall, students found the iPad useful, learning-enhancing and enriching. Main apps used included Safari, Notes, Camera, Quickvoice/Voice memo and Maps. As one learner stressed, "It is the first time iPads were introduced in a class at SMU. We felt that many students were very engaged and interested. We worked in groups for a web quest activity to answer quiz questions. It is incredible that the Internet is 'in your hands', as Steve Jobs puts it, and better still, it requires no boot time. The iPad was useful as it allowed us to browse the Internet for instantaneous information in relation to the quiz, search for images and download them to get an idea of what the new water plant looks like prior to the visit". Besides taking group photographs, participants also utilized the Voice recording feature to record the presentation by a PUB (Public Utility Board) representative during the centre visit. This was regarded as "excellent" as it allowed them to capture learning contents and discussion details for later reuse.

In order to effectively integrate modern communication tools such as the iPad into course designs, it is essential that the chosen technology is pedagogical meaningful. In our case, questions posed by the instructor via an old-fashioned quiz to be tackled 'on the go' and 'on site' were challenging, closely related to the learning objectives of the respective session topic and required access to various apps, including 3G (the third generation of wireless technologies). In comparison to previous generations of wireless technologies, iPad2 3G enhancements such as high-speed transmission,

advanced multimedia access, high speed web browsing or the faster downloading of data were functional and value added as the learning goal achievement required such ‘connectivity’.

But there were also a few unforeseen teething problems like unanticipated requests to provide worksheets and quizzes online on the iPad itself to make it easier to work (rather than as a hard-copy distributed on the bus as done by the instructor) or to allocate more time for problem-based group work so that every student can utilise the iPad. Some students felt that an iPhone has the same portable search tool capability and that “an iPad is just a blown up version of it”. Others claimed that the quality of the iPad camera is not as good as that of an iPhone 4.

Despite some critical feedback, our pilot project suggests that the iPad is particularly useful for mobile learning in the context of field trips and site visits as confirmed by students who found the iPad’s connectivity “convenient” as they do not have Internet access on their laptop. As one student stressed, “Overall, it was a good experience as I could get access to all the information even when I was walking around. And the fact that there is 3G everywhere I go makes learning even more convenient.” While typing on a laptop keyboard was perceived as “much faster” than typing on a touch screen, the iPad comes in handy when learners are “out there on the go” because it provides them with a “lighter option”.

3. Leveraging web technology via several connection points

One limitation in teaching during term time refers to the connection points with students if we are confined to primarily classroom time. Yet, we know as educators that the learning process is arguably taking place at other times (and perhaps mostly outside the classroom). At the same time, we see our students all over campus continually connected to their mobile devices, laptops, and tablets. Our goal in using technology is to supplement the contact time and make our experience together in the term something that is more enriching and thought provoking – which is especially important in leadership and human capital-related courses. As such, we were looking for tools that would help with on-line discussion, easy access to supplemental and entertaining materials,

and engaging sites that would draw them into the learning process. The following innovative teaching approaches turned out to be suitable for that purpose:

3.1. Edmodo site

Like Twitter, YouTube, Facebook or Moodle, Edmodo is a collaborative social learning platform website teachers and students can use to manage events, course assignments or study groups. With a Facebook-like interface, it allows students to feel comfortable posting in a secure site to share ideas about learning contents as illustrated in Fig. 2 which shows group posts by students enrolled in the course ‘Leadership in a Global Context’. As the posts indicate, replies to posts by other students help learners to gain new insights before and after the lessons. This helps enrich the topics and allows time for reflection, which is quite important in topics such as leadership. Supplemental course content such as videos and articles are linked to enhance the learning and allow for personal exploration. In order to get access to Edmodo sites, the instructor needs to create a link such as <https://www.edmodo.com> as in the case of our course ‘The Mosaic of Leadership’ and ‘Leadership in a Global Context’. Each user must set up an Edmodo account. Instructors can then lock the account at the start of the term to ensure security and trust in the sharing for the site. Students who would like to access the site will have to log in and request to join or to contact the university’s Centre for Teaching Excellence if they need help. The instructor can unlock the sites for review, but they will automatically lock after a few days. Figs. 2 and 3 below show how students made use of this site.

The Edmodo Mobile App (<https://www.edmodo.com/mobile>) allows students to see posts, add comments, and explore content on the go. Nothing is arguably more rewarding than seeing one’s own students outside the classroom watching one of the class videos instead of doing Facebook! The Edmodo Mobile App enabled students to stay connected on the go. While it did not have full functionality, it allowed for simple collaboration and comments to posts. Students were able to respond to discussion threads on hot topics such as generational differences, diversity in leadership,

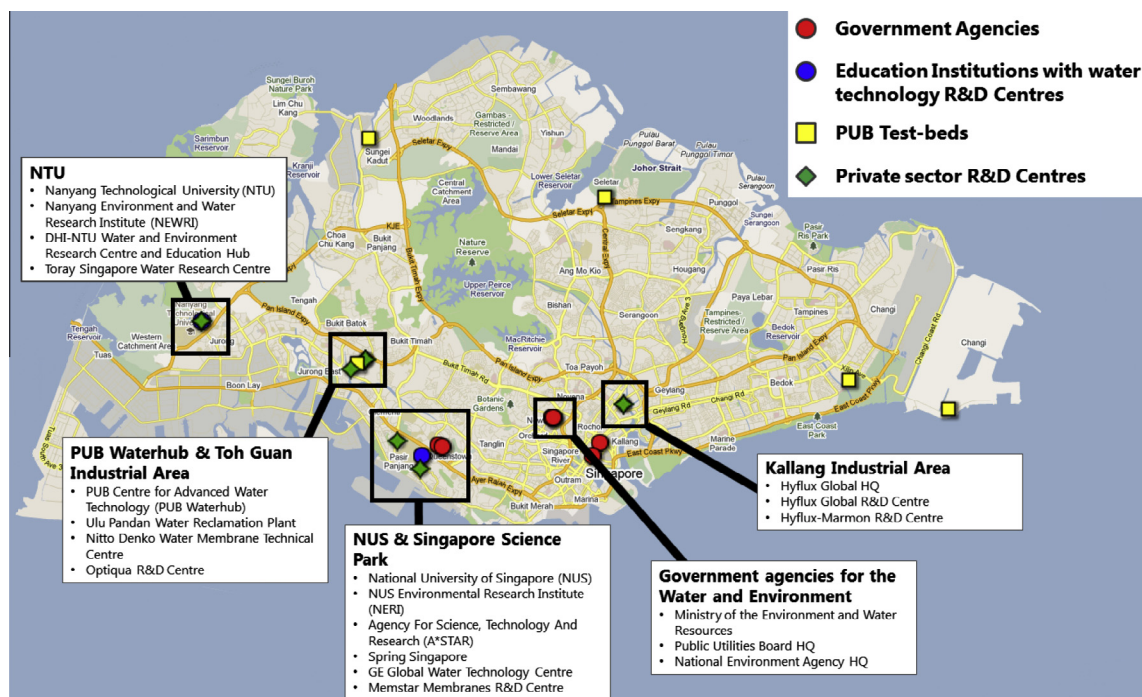


Fig. 1. Locations of key players in Singapore's Environment and Water Industry.

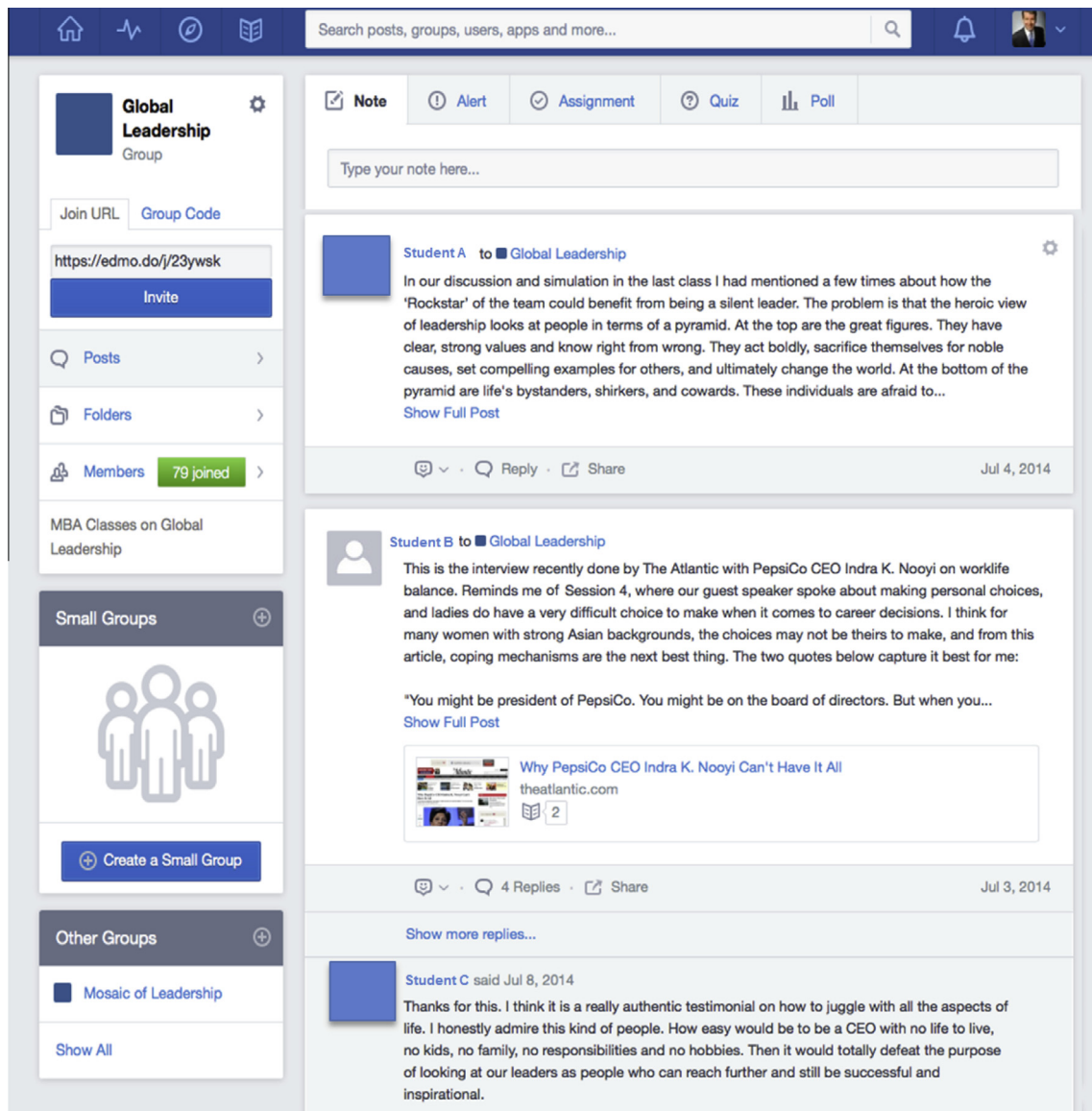


Fig. 2. Group posts by students in course 'Leadership in a Global Context'.

and cultural considerations when they were away from the classroom. The mobile app was optional and used by students with a keen interest in the use of mobile devices.

The collaboration for the first course started a bit slowly as the students took a while to warm up to this new idea. In the course 'Leadership in a Global Environment', the site became quite active. It is great to see the on-line collaboration and sharing of ideas outside the classroom. Many students have commented on the fact that it adds a bit of richness to the topic and allows them to contribute to the learning process in a different way. Several commented that learning about leadership also includes how to lead with on-line tools and social media. This tool allows students to not only share ideas and views, but also to see the dynamics of leadership in the social media setting.

3.2. Google Site for human capital strategy course

Google Sites is a structured wiki- and web page-creation tool which Google provides as part of its Google Apps Productivity suite. In the course on 'Human Capital Strategy', this tool enabled

easy access to course content, discussion fora, and class sharing. This site serves as a means of organizing and sharing supplemental information that accompanies the course and the textbook. While the Edmodo site provided a means for collaboration, it helped with organisation, sharing of external materials and a fun way of keeping the class on track with the topics. The site is only accessible to enrolled students with an SMU ID. Fig. 4 below shows a view of the site.

As a part of this site, a number of videos were incorporated, including an animated video series. Using animation software, the instructor used a video animation software called "Go Animate" to create a series of short videos where the characters explore the topic of the week in a fun and light way to help convey the key points. While it contains a bit of dry humor and light-hearted fun, each video carries the key messages about the topic for each lesson. These videos are housed in a secure YouTube account embedded into the Google Site that is only accessible with a university ID and password (single sign-on). Fig. 5 below shows how this sub-site looks like with reference to the topic 'Organisation Culture' covered in week 2 of the course.

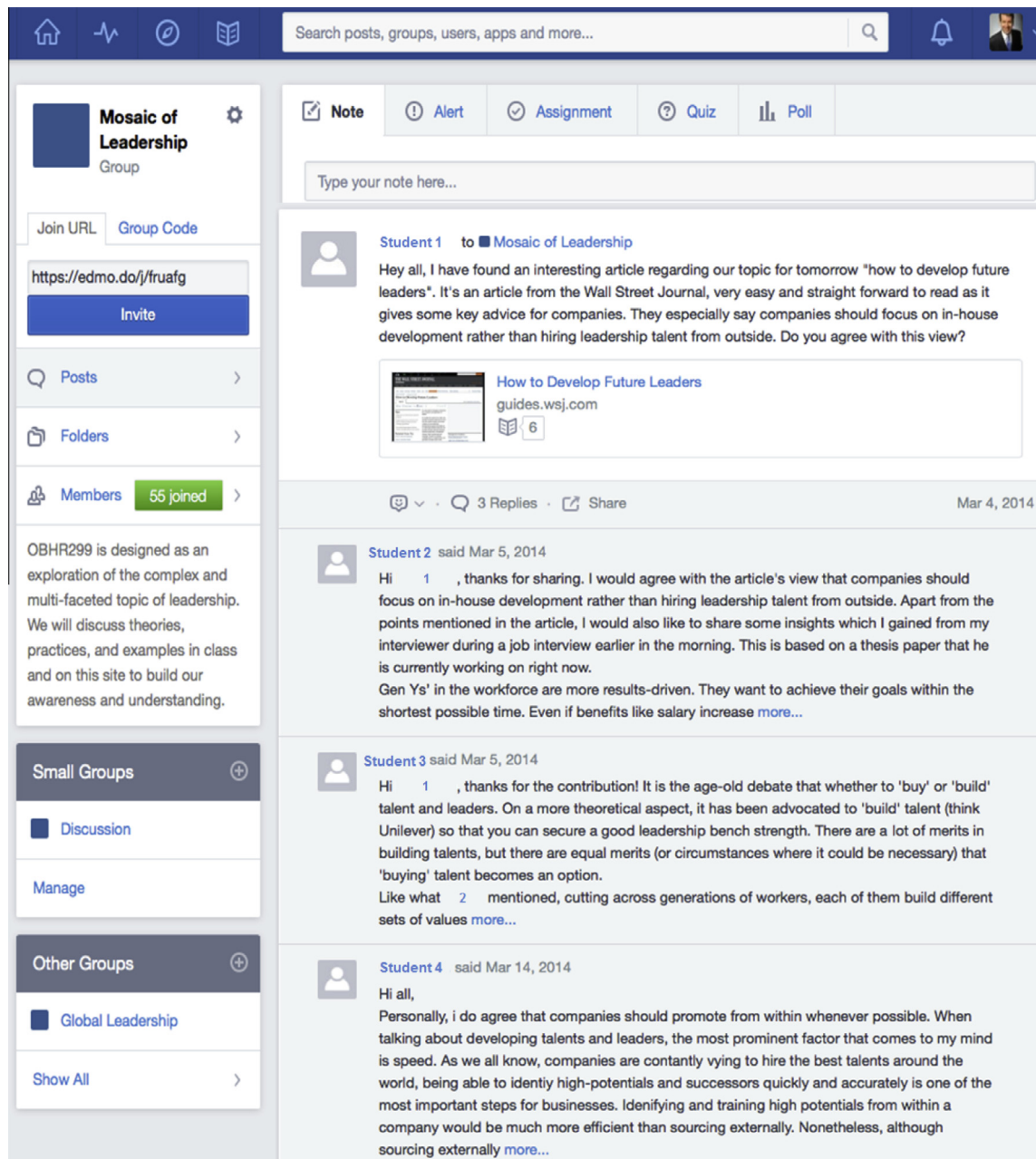


Fig. 3. Students' posts in course 'The Mosaic of Leadership'.

3.3. Strategyzer team web site

Strategyzer is a tool to develop 'better' business models (<https://strategyzer.com>). We introduced this team-based tool in a new 'Business Capstone Course' to help students to manage their team processes both inside and outside the classroom experience more effectively. As this is a secure external site for SMU, the instructor cannot open the access to everyone. The screenshot below (see Fig. 6) indicates how students can use Strategyzer to interactively brainstorm and capture team ideas for a business concept (it literally adds virtual post-it notes to the business model canvas). The site has a back end that allows groups of students to build a business case and to prototype their ideas.

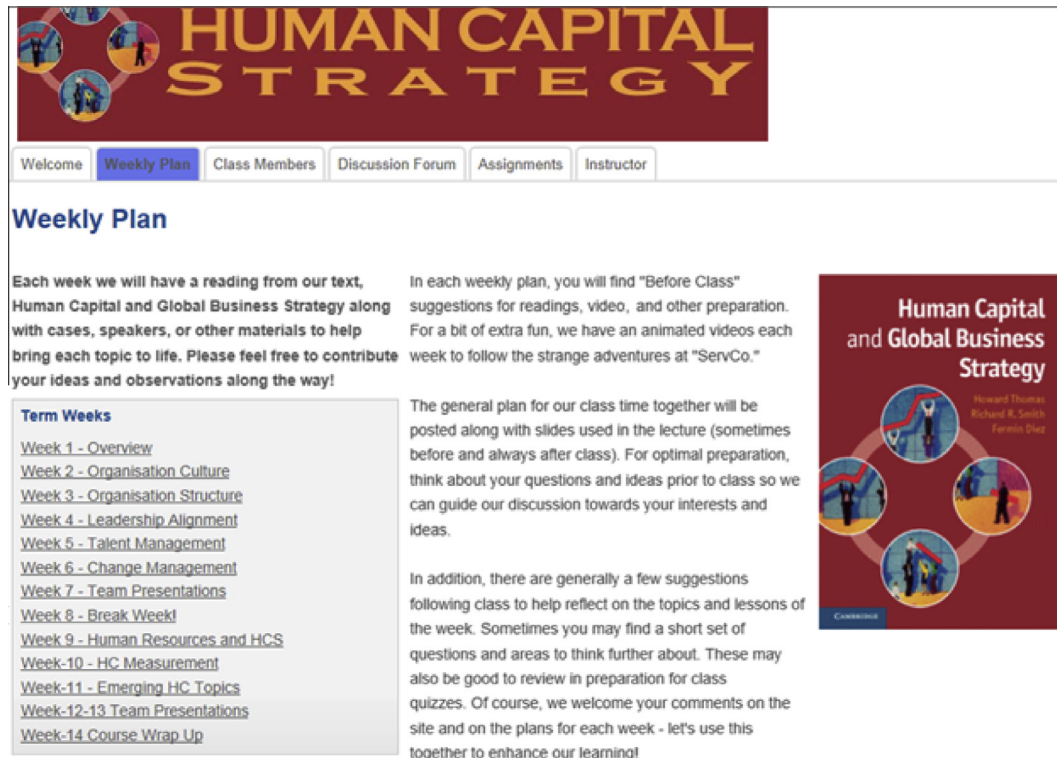
3.4. Instructor web site and repository

For the new 'Business Capstone' course (which was created together with another colleague), a special site for instructors

was created to share materials, ideas, activities, and experiences as a first attempt at team teaching for this core course (see Fig. 7). Since we intend to use this site as an ongoing collaboration mechanism, we posted all our course materials, lesson outlines, potential activities, and supplemental information. In addition, videos of each lecture have been embedded for easy reference by new instructors (see Fig. 8). While we are still learning how to optimize this tool, initial feedback by students is promising. Access is restricted only to capstone instructors within the university.

3.4.1. Business capstone student site

This capstone student site is a Google Web Site to help students stay organized and on track in this resource-rich project-based course (see Fig. 9). The site allows us to keep students on track and offers instructors a consistent experience across the various capstone sections. This site is secured and limited to the students in each class section. To help us organize the Business Capstone course across sections, we created a special site that can be



Weekly Plan

Each week we will have a reading from our text, *Human Capital and Global Business Strategy* along with cases, speakers, or other materials to help bring each topic to life. Please feel free to contribute your ideas and observations along the way!

In each weekly plan, you will find "Before Class" suggestions for readings, video, and other preparation. For a bit of extra fun, we have an animated videos each week to follow the strange adventures at "ServCo."

The general plan for our class time together will be posted along with slides used in the lecture (sometimes before and always after class). For optimal preparation, think about your questions and ideas prior to class so we can guide our discussion towards your interests and ideas.

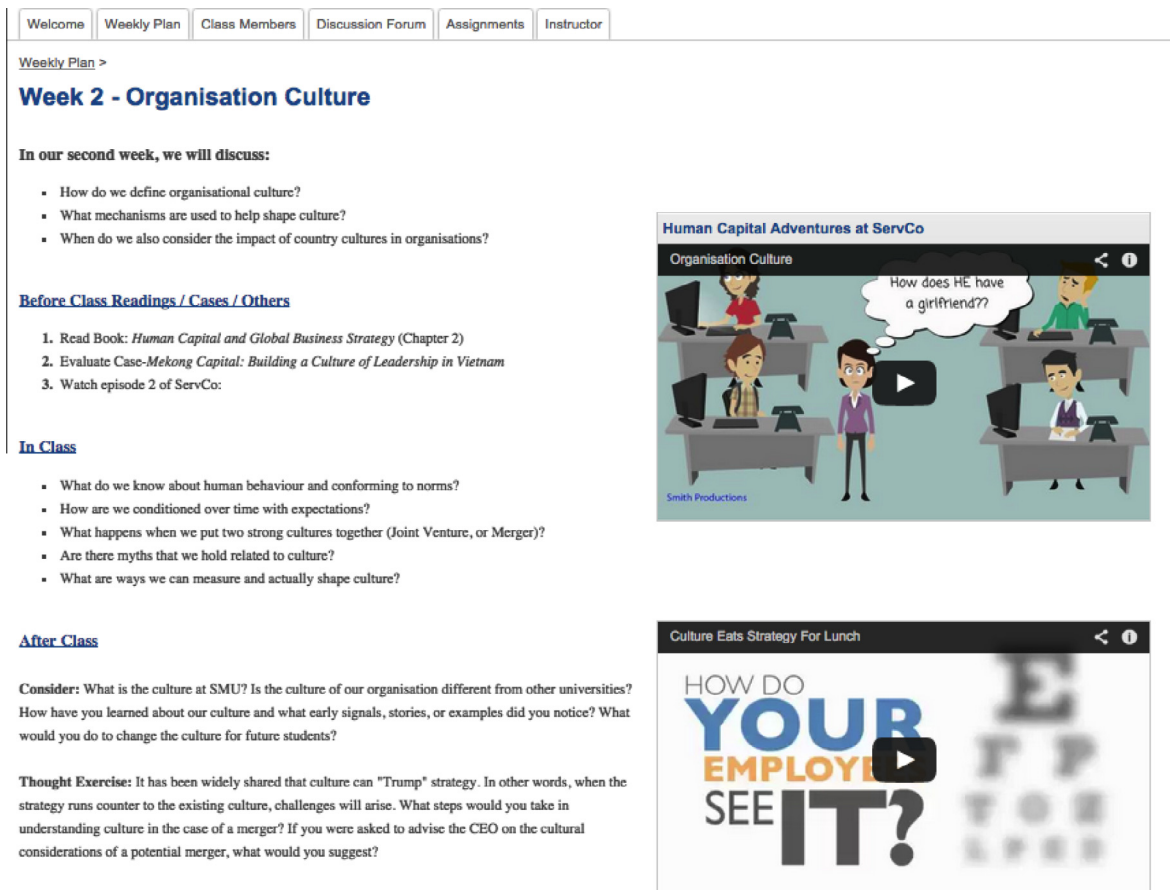
In addition, there are generally a few suggestions following class to help reflect on the topics and lessons of the week. Sometimes you may find a short set of questions and areas to think further about. These may also be good to review in preparation for class quizzes. Of course, we welcome your comments on the site and on the plans for each week - let's use this together to enhance our learning!

Term Weeks

- [Week 1 - Overview](#)
- [Week 2 - Organisation Culture](#)
- [Week 3 - Organisation Structure](#)
- [Week 4 - Leadership Alignment](#)
- [Week 5 - Talent Management](#)
- [Week 6 - Change Management](#)
- [Week 7 - Team Presentations](#)
- [Week 8 - Break Week!](#)
- [Week 9 - Human Resources and HCS](#)
- [Week 10 - HC Measurement](#)
- [Week 11 - Emerging HC Topics](#)
- [Week 12-13 Team Presentations](#)
- [Week 14 Course Wrap Up](#)

Human Capital and Global Business Strategy
Howard Thomas
Richard R. Smith
Patricia Diaz

Fig. 4. Google Site of Human Capital Strategy Course.



Weekly Plan >

Week 2 - Organisation Culture

In our second week, we will discuss:

- How do we define organisational culture?
- What mechanisms are used to help shape culture?
- When do we also consider the impact of country cultures in organisations?

Before Class Readings / Cases / Others

1. Read Book: *Human Capital and Global Business Strategy* (Chapter 2)
2. Evaluate Case-Mekong Capital: *Building a Culture of Leadership in Vietnam*
3. Watch episode 2 of ServCo:

In Class

- What do we know about human behaviour and conforming to norms?
- How are we conditioned over time with expectations?
- What happens when we put two strong cultures together (Joint Venture, or Merger)?
- Are there myths that we hold related to culture?
- What are ways we can measure and actually shape culture?

After Class

Consider: What is the culture at SMU? Is the culture of our organisation different from other universities? How have you learned about our culture and what early signals, stories, or examples did you notice? What would you do to change the culture for future students?

Thought Exercise: It has been widely shared that culture can "Trump" strategy. In other words, when the strategy runs counter to the existing culture, challenges will arise. What steps would you take in understanding culture in the case of a merger? If you were asked to advise the CEO on the cultural considerations of a potential merger, what would you suggest?

Human Capital Adventures at ServCo
Organisation Culture
How does HE have a girlfriend??
Smith Productions

Culture Eats Strategy For Lunch
HOW DO YOUR EMPLOYEES SEE IT?

Fig. 5. Embedded videos in Instructor's Google Site.

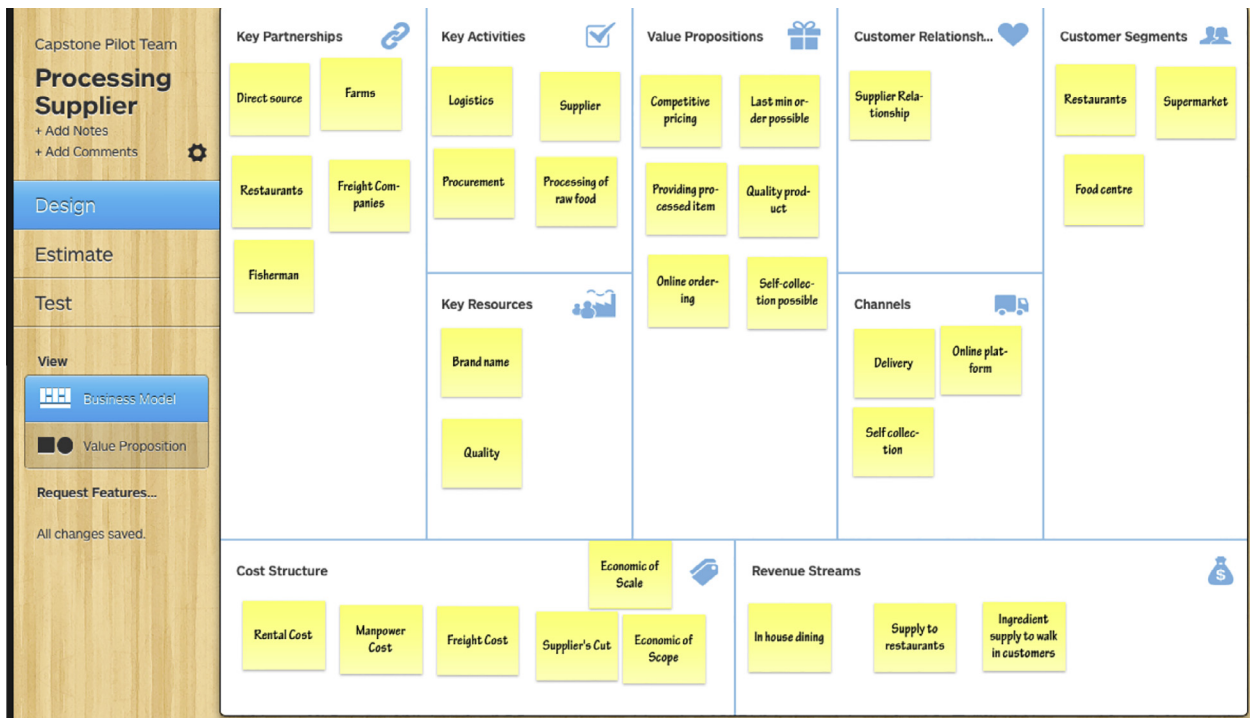


Fig. 6. Strategyzer team web site.

Welcome! Updated Jun 17, 2014, 6:33 PM

rsmith@smu.edu.sg

Search this site

INSTRUCTOR SITE for the SMU Business Capstone:

THE DESIGN OF BUSINESS

Welcome! Lesson Plans Resources Assessment Instructors

Welcome!

About this site: This is a secure site for SMU faculty involved in teaching the LKCSB Capstone: The Design of Business. We will use this site to share our learning, plans, and materials for the course. The current material and videos are based on the 2014 course pilot in term 3B. Please use this site as a resource and please offer suggestions and updates to improve our collective impact with this course.

Course Outline

- [Week 1 – Introduction and Overview](#)
- [Week 2 – Customer Insight](#)
- [Week 3 – Ideation Methods](#)
- [Week 4 – Prototyping Ideas](#)
- [Week 5 – Trends and Scenarios](#)
- [Week 6 – Ideating Business Models](#)
- [Week 7 – Prototyping Business Models](#)
- [Week 9 – Team Proposals](#)

Using this Site to Support Our Teaching:

While each instructor will bring his or her own flavour to this course, we want to create a consistent experience for our students and leverage our best thinking as an instructor team. Here are ways that each of us can use this site to help enhance our teaching:

Lesson Plans – in each lesson plan page, you will find a draft lesson plan, readings, videos from the pilot, attached materials, and other tips. Hopefully this will provide a starting point for you in your planning. Please post your own ideas and plans on what worked and what new ideas you may have to share with others.

Resources – we will have the opportunity to use a web-based tool (Strategyzer) for business modelling, a student google site, and other types of resources to support the learning. Feel free to suggest other potential support mechanisms for our instructor team.

Assignments – draft assignments are posted for here and it is important that we are relatively consistent in this across the sections. Please post other ideas and versions for our collective learning.

Fig. 7. Secure site for 'Business Capstone' Course Instructors.

replicated and used by each instructor. This allows us to embed a number of video supplements, course materials, and plans for the students in a way that makes it easy for students to follow and track.

3.4.2. Individual feedback

Students receive a personal connection from the instructor about their assignment and their progress in class. Attempts are underway to provide this through the technology as an additional personal connection. We have found that this level of personal attention is highly valued by students. One of them put it this way: *"The prof really helps us to learn more about ourselves. For example, during our individual assignment, he gave each and everyone of us an envelope (containing a letter) to tell us about our strengths and weaknesses. Honestly, the weaknesses he identified were a little blunt and it affected me for a few days. However, I am really glad that he did it because it got me to reflect on myself and encouraged me to see how I can improve myself."*

4. Aligning an information systems capstone course with real-world business problems

Capstone courses are common in engineering, computer science, information systems and business schools. At SMU, about

250 Information System students have to complete a core capstone course before they graduate. In this capstone course (Boesch & Gan, 2014), students get an opportunity for active learning (Bonwell & Eison, 1991; Lowman, 1989). They apply what they learn in the classroom to solve a real-world business problem. The out-of-class environment provides a challenging experience where students encounter unexpected obstacles, which usually leads to learning new tools or techniques. Students are matched with local companies to solve industry problems that might be addressed by the creation of a new information system. Over the years, our students have created web portals, mobile applications, content management systems and a variety of other systems for clients, including a scheduling system used to schedule our capstone presentations. As the capabilities of the student teams and the capstone course in general have improved, more companies have begun to partner with the university to make additional projects available to the students. We use a wiki to manage the many projects and communicate across the different stake holders.

4.1. Development methodology using wiki

Students are encouraged to use an agile methodology with the focus on iterative development (Ochs & Getzler-Linn, 2012). Many

Week-12 - Organizational Context I a minute ago

INSTRUCTOR SITE for the SMU Business Capstone:

THE DESIGN OF BUSINESS

Welcome! Lesson Plans Resources Assessment Instructors

Lesson Plans >

Week-12 - Organizational Context I

Objectives for this session:

In this session we will consider the challenges of introducing a new business model or changing business model inside a current organisation.

Readings and Background for Instructor

- Osterwalder & Pigneur (2010): *Business Model Generation* (pp 256-257)
- Videos posted to Student Capstone Site
- Govindarajan, V. and Trimble, C. (2005) Building Breakthrough businesses within established organizations. Harvard Business Review OnPoint Edition - 9955
- Kotter, J. P. (1995). Leading change: Why transformation efforts fail. Harvard business review, 73(2), 59-67.

Draft Lesson Plan

- Lecture and review on managing strategic change
- Organizational Behaviour and managing stakeholders
- Review Kotter's Rules for managing change
- Case Study: Hong Kong Daily Times
- Project Team Time

Lessons Learned in Pilot

Observations: The teams will need time to prepare. This lesson provides an opportunity for them to reflect on the challenges of implementing change and can draw from their OB classes for insight.

Other considerations might include short activities related to managing large scale change.

Tips and Suggestions

Activity: Use the case study to have the students really consider how to manage the change process and the stakeholders in this case.

Expectations: Some will have strong experience in this topic - others may not.

Attached below you will find materials for this lesson. Please post your comments, ideas, and materials below:

Video clips from the pilot lessons:

YouTube Video

Capstone 12a

YouTube Video

Capstone 12b

Fig. 8. Secure Site for 'Business Capstone' Course Instructors with embedded videos.

Fig. 9. Business Capstone student site powered by Google Site.

teams elect to follow a modified version of SCRUM (Sutherland & Schwaber, 2013). There are three milestones: *acceptance*, *midterm* and *final presentations*; and three deliverables: *a poster*, *a video pitch*, and *a public wiki page*. To aid in setting expectations, all students are required to maintain a public wiki page outlining all aspects of their projects. This wiki along with their presentations serves as the documentation for their project. Since most wiki pages are public, teams currently enrolled in the course can see the other teams' projects. The midterm and final presentations assessments comprise the majority of the students' final grades. Before the final presentations, teams are required to create a poster, a video pitch and attend a poster fair. The poster and videos are available on the wiki as well. The poster fair is a public event on campus attended by project sponsors, students, faculty, and the general university community. Various prizes are awarded to the top teams. Teams create new applications to solve real-world problems each year. The opportunities to make an impact are significant. At the same time, if students are given opportunities to work on problems at the forefront of technology to solve real problems, they will be actively learning and will be better prepared to make a positive impact when they graduate and enter the workforce. By raising awareness and improving the overall project quality, we hope that the capstone course will produce better-trained students for the Singapore IT industry; one of the primary goals of the SMU Information Systems undergraduate program (see Fig. 10).

4.2. Active learning

The main idea behind active learning is to involve students in doing things and thinking about the things they are doing. This does not have to be in the classroom (McKenzie, Trevisan, Davis, Beyerlein, 2004). Our capstone course involves only one hour of

classroom time where all students are gathered to hear a briefing on the assessment structure and methodology. Students are expected to meet regularly as a team with their sponsors and with faculty supervisors. Meetings with sponsors involve gathering requirements, validating prototypes, and testing the quality of the system. The regular interactions with the faculty supervisors involve the team reporting their weekly progress and sometimes reflecting on what they learnt. These meetings allow the faculty to provide feedback and formatively assess the students' progress. In most cases, students are actively learning during teamwork, interacting with real clients and reporting progress to faculty supervisors.

In 2004, a study on capstone design courses and assessment (McKenzie et al., 2004) found that assessment is not done well with uncertain assessment practices. More recent research by Ochs and Getzler-Linn (2012) suggests that industry sponsors have direct impact on how students are assessed. They suggested a formative assessment during "gradable moments", similar to our regular supervisor meetings. That research uses sponsor feedback to help improve the assessment, such as the requirement for suitable written communication. In the following, we discuss the assessment of the student experience, which is largely determined by the types of industry projects and tools they use. As a relatively young school of just over 10 years, we are able to improve the quality of industry sponsors and project deliverables as the Singapore IT market place changes. This is done by raising the quality of the deliverables by supporting some tools and techniques involved.

4.3. Tools and techniques

As an Information Systems school, we teach many software development tools. Students pick up technologies that are most appealing to them, such as mobile technology (Lytras, 2010). As

2014/2015 Term 1 [edit]

Schedule [edit]. Inform course coordinator by 18 May (no teams will be added after that date), please submit your 2 page proposal [edit] by 18 June.

Presentations:

- Please schedule acceptance, midterm & final [edit]. Time slots are inclusive of Q&A.
- Please refer to grading [edit], video [edit] & guide.
- The entire team must be at the presentation. Supervisors and course coordinator must be at Acceptance. Reviewers must be at Midterm. Supervisor & first reviewer must be at the Finals. The team should invite the sponsor.

Click on your team name in the team column to update your team wiki page. Have fun!

Supervisor	Reviewers	Team	Project	Members	Sponsor
Benjamin Gan	Jason WOODARD & Chris BOESCH	Happy Sounds [edit] Acceptance [edit] Pitch [edit]	Carousell (http://carousell.co/app) [edit] HappySounds brings the Carousell experience to the web, enhancing it with better browsing and a brand new offer management system.	1. HENG U San 2. TAN Qi Yang 3. LIM Yi Sheng 4. Sulovna SUSANT	Victor, the Lead Engineer, Carousell [edit]
Benjamin Gan	Youngsoo KIM & Jason	PentaMatrix [edit] Acceptance [edit] Pitch [edit] Samsung Galaxy S4 GT-I9505 black mist (black cover) S/N: RF1D82AXEBZ IMEI:	Alan Owyong - Birds of Singapore Android App BirdsofSG will enhance the bird watching experience for birders through an Android app to	1. Luqman Haqim Bin Ab RAHMAN 2. HUANG Jun Ming 3. TAN Yu	Alan Owyong, Chairman Nature Society (Singapore) Bird

Fig. 10. Information system capstone course using WikiMedia.

they extend their skills, multiple teams start to deploy Apple's iOS App Store and Google's Play Store. They build web-responsive web apps which can run on multiple platforms. Another technology is the use of cloud computing. Teams are using virtual machines that are hosted by the university. This has progressed towards utilising web hosted platforms and eventually platforms-as-a-service such as Amazon Web Services, Google App Engine and Microsoft Azure. By using third party platforms, students build on existing rich frameworks and tap on their development methodology. On the mobile, this allows them to develop "apps" that are tested, and deployed to an application platform or service prior to the end of the capstone term. This methodology provides a clear milestone. Apps can be downloaded quickly and used in the real world. Similarly, by pushing web applications on the cloud, they can be continually tweaked and modified easily. The methodology teaches students to develop smaller chunks of applications that can be tested by many users. It also helps that companies such as Apple conduct some quality checks on application that are submitted to their iOS App Store. Students learn the concept of minimum viable product (Ries, 2011), where they can acquire a maximum amount of validated learning about customers with the least effort. These deployed applications on mobile or the cloud can be tested quickly to understand how customers use their functionality. Students learn by doing a real world project for real customers in a direct, user centred and test based environment.

While mobile applications and minimum viable product works well in a start-up environment, multinational enterprises require more scalable, secure and reliable solutions. In order to provide for a diverse group of graduates, our capstone project sponsors include enterprise solution providers that use tools such as Oracle, PeopleSoft, Sales force and SAP. These projects require a different approach with sponsors that support training of these tools. Working with large financial and healthcare companies, solution providers, and consulting firms encourages students to take on these projects despite the higher learning curve. However, due to the schedule of our capstone course, teams are mostly able to develop

proof of concept demonstrations of the enterprise solutions designed for larger enterprises.

5. Conclusion

Web-based teaching and learning approaches have been recognized as important tools to enhance the educational experience of students and their collaborative learning curve. While representative studies about the effectiveness of iPads in higher education are still rare, we argue based on prior pedagogical research (Menkhoff & Bengtsson, 2012; Menkhoff, Thang, Chay, & Wong, 2011) and our experiences in various classes that such tools are useful in the context of collaborative learning for the following reasons: (i) as part of students' blended learning experiences, they support groups of learners in mastering collaborative project tasks and achieving course objectives; (ii) they help students to leverage the power of collaborative learning scenarios and to further develop key competencies with the help of their peers; and (iii) they engage students to search for (and gain) more knowledge, e.g., by tackling truly challenging project assignments with relevant issues. As one course participant suggested, it would make sense to supplement iPad-enabled learning exercises with (even) more social media applications. It was stressed that the class could have been given more time as a group to tweet about their learning experiences and to evaluate the iPad use during the bus ride back from the NEWater Visitors Centre to the university. This would have greatly enhanced knowledge flows amongst them via responses to twitter messages and retweeting.

As the comment about Twitter suggests, instructors have a tremendous opportunity to embrace technology as an integral part of the learning process. Going forward, we are pushing towards a more blended, collaborative learning experience for our students while also introducing new ways for them to prepare for their future careers (McCarthy, 2010). As our pilots with Google Site or mobile apps have shown, technology can enhance our impact on

students and provide opportunities for more personalization amidst greater collaboration, eventually helping instructors to not only be more effective teachers but also create students able to embrace new challenges in their future careers. In addition to our individual efforts as instructors eager to make collaborative learning more effective as illustrated in Table 1, we believe that more cooperation amongst instructors is necessary. Too often we focus only on our own courses and do not consider the overall curriculum requirements vis-à-vis the dynamic and volatile environment in which we find ourselves. Leveraging technology, project-based learning and real team teaching will arguably help to better prepare our students for future challenges in business and society.

As the process of creating and deploying IT solutions has become easier, our focus in the area of information systems management teaching and learning has started to shift more towards ensuring that the right solutions are being built and to destil some of the lessons learnt by students while creating these solutions. It is no longer a question of what can be built in five months but rather what should be built and how students and their clients will know if a good solution was built given the time and resources provided. As the questions about projects have shifted from the technical to the experiential, new tools, processes, and resources have been added. Many students now follow the Lean Startup Methodology (Ries, 2011), and all teams are required to do multiple rounds of user testing during the course. The Lean Startup Methodology allows minimum viable products to be developed and tested quickly with actual users thereby improving the quality and focus on what to build. Whether capstone or not, all courses with an emphasis on collaborative learning will need to continue to evolve as business and societal environment changes.

University leaders interested in leveraging interactive digital media and a strong brand will have to ensure that there are sufficient resources to purchase an adequate number of gadgets in an era of rapidly changing technologies and to enable both students and instructors to make full use of them. Educators will have to be properly trained (and retrained) so that they can effectively deploy these technologies and fairly monitor/assess students' collaborative learning outcomes. Both technophobic and technophile instructors (as well as students) expect instant technical support in case of major technical issues arising which will further stretch existing teaching and learning budgets. Ignoring such challenges will arguably increase the chances that educational disruptors such as the massive online course movement will make traditional institutions of higher learning redundant in the mid run.

References

- Arnold, N., & Paulus, T. (2010). Using a social networking site for experiential learning: Appropriating, lurking, modelling and community building. *Internet and Higher Education*, 13(4), 188–196.
- Benson, V., Morgan, S., & Tennakoon, H. (2012). A framework for knowledge management in higher education using social networking. *International Journal of Knowledge Society Research*, 3(2), 44–54.
- Boesch, C., & Gan, B. (2014). Evolving an information systems capstone course to align with the fast changing Singapore marketplace. Capstone Design Conference 2014 Proceedings, Columbus, Ohio. <<http://www.capstoneconf.org/resources/2014%20Proceedings/Papers/0065.pdf>>.
- Bonwell, C., & Eison, J. (1991). Active learning: Creating excitement in the classroom (ASHE-ERIC Higher Education Report No. 1). Washington, DC: George Washington University.
- Cook, J., Bradley, C., Holley, D., Smith, C., & Haynes, R. (2006). *Introducing blended mLearning solutions for higher education students*. mLearn, Banff Canada, October 22–25.
- Damiani, E., Lytras, M. D., & Cudré-Mauroux, P. (2010). Guest editorial in special issue on human-centered web science. *World Wide Web*, 13(1–2).
- Ebner, M., Lienhardt, C., Rohs, M., & Meyer, I. (2010). Microblogs in higher education – A chance to facilitate informal and process-oriented learning? *Computers & Education*, 55(1), 92–100.
- Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, 14, 532–550.
- García-Peñalvo, F. J., Colomo-Palacios, R. C., & Lytras, M. D. (2012a). Outcomes of international research projects on technology applied to education. *Journal of Universal Computer Science*, 18(1).
- García-Peñalvo, F. J., Colomo-Palacios, R. C., & Lytras, M. D. (2012b). Informal learning in work environments: Training with the social web in the workplace. *Behaviour & IT*, 31(8), 753–755.
- Johnson, D. W. (2003). Social interdependence: The interrelationships among theory, research, and practice. *American Psychologist*, 58(11), 931–945.
- Johnson, D. W., & Johnson, R. (1999). *Learning together and alone: Cooperative, competitive, and individualistic learning* (5th ed.). Boston: Allyn & Bacon.
- Lowman, J. (1989). Active learning: Beyond the classroom. <<http://cfe.unc.edu/pdfs/FYC3.pdf>> Retrieved March 2014.
- Lundin, J., Lymer, G., Holmquist, L. E., Brown, B., & Rost, M. (2010). Integrating students' mobile technology in higher education. *International Journal of Mobile Learning and Organization*, 4(1), 1–14.
- Lytras, M. D. (2010). From the special issue editor: Information systems research for a sustainable knowledge society. *IS Management*, 27(3), 196–197.
- Lytras, M. D., & Ordóñez de Pablos, P. (2011). Software technologies in knowledge society. *Journal of Universal Computer Science*, 17(9), 1219–1221.
- McCarthy, J. (2010). Blended learning environments: Using social networking sites to enhance the first year experience. *Australasian Journal of Educational Technology*, 26(6), 729–740.
- McKenzie, Larry J., Trevisan, Michael S., Davis, Denny C., Beyerlein, & Steven, W. (2004). Capstone design courses and assessment: A national study. Duke energy/Washington State University/University of Idaho. In *Proceedings of the 2004 American society of engineering education annual conference & exposition*.
- Menkhoff, T., & Bengtsson, M. L. (2012). Engaging students in higher education through mobile learning: Lessons learnt in a Chinese entrepreneurship course. *Educational Research for Policy and Practice*, 11(3), 225–242.
- Menkhoff, T., Thang, T. Y., Chay, Y. W., & Wong, Y. K. (2011). Using web-based ICT in learning: A case study of a knowledge management programme. *The Journal of Information and Knowledge Management Systems*, 41(2), 132–151.
- Ochs, J. B., & Getzler-Linn, L. (2012). Direct, authentic and formative assessment of cross-college industry-sponsored capstone project teams. Lehigh University, Capstone Design Conference Proceedings.
- Picciano, A. G. (2002). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Journal of Asynchronous Learning Networks*, 6(1), 21–40.
- Ries, E. (2011). *The lean startup: How today's entrepreneurs use continuous innovation to create radically successful businesses*. Crown Publishing.
- Saeed, N., Yun, N., & Sinnappan, S. (2009). Emerging web technologies in higher education: A case of incorporating blogs, podcasts and social bookmarks in a web programming course based on students' learning styles and technology preferences. *Journal of Educational Technology & Society*, 12(4), 98–109.
- Stebbins, R. (2001). *Exploratory Research in the Social Sciences*. Thousand Oaks: Sage Publications.
- Sutherland, Jeff, & Schwaber, K. (2013). The Scrum Guide. Scrum.org. Retrieved March 2014. Ordóñez de Pablos, P., & Lytras, M.D. (2013). Editorial. *Journal of Web Engineering*, 12(5), 361–362. <<http://www.scrumguides.org/docs/scrumguide/v1/scrum-guide-us.pdf>>.
- Thomas, H., Smith, R., & Diez, F. (2013). Human capital and global business strategy published by Cambridge University Press. <<http://www.cambridge.org/sg/academic/subjects/management/human-resource-management/human-capital-and-global-business-strategy?format=PB>>.
- Wallin, M. W., & Von Krogh, G. (2010). Organizing for open innovation: Focus on the integration of knowledge. *Organizational Dynamics*, 39(2), 145–154.
- Wankel, C. (2009). Management education using social media. *Organization Management Journal*, 6(4), 251–262.